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FEDERAL COMMUNICATIONS COMMISSION

47 CFR Part 54

[WC Docket Nos. 10-90, 05-337; DA 13-807]

Connect America Fund; High-Cost Universal Service Support

AGENCY: Federal Communications Commission.

ACTION: Final rule.

SUMMARY: In this document, the Federal Communications Commission (Commission) primarily addresses the model platform, which is the basic framework for the model consisting of key assumptions about the design of the network and network engineering. The Commission also addresses certain framework issues relating to inputs.

DATES: Effective **[INSERT DATE 30 DAYS AFTER PUBLICATION IN THE FEDERAL REGISTER]**.

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SUPPLEMENTARY INFORMATION: This is a summary of the Commission's Report and Order in WC Docket Nos. 10-90, 05-337; DA 13-807, adopted on April 22, 2013 and released on April 22, 2013. The full text of this document is available for public inspection during regular business hours in the FCC Reference Center, Room CY-A257, 445 12th Street, S.W., Washington, DC 20554. Or at the following Internet address: http://hraunfoss.fcc.gov/edocs_public/attachmatch/DA-13-807A1.pdf

I. INTRODUCTION

1. In the USF/ICC Transformation Order, 76 FR 73830, November 29, 2011, the Commission comprehensively reformed and modernized the universal service and intercarrier compensation systems to maintain voice service and extend broadband-capable infrastructure. As part of the reform, the Commission adopted a framework for providing support to areas served by price cap carriers known as Phase II of the Connect America Fund. An estimated eighty-five percent of the approximately 6.3 million locations in the nation that lack access today to terrestrial fixed broadband at or

above the Commission's broadband speed benchmark live in areas served by price cap carriers. The Connect America Fund will maintain voice service and expand broadband availability to millions of unserved Americans living in these areas within the next five years, and aims to close this gap entirely within a decade. Through Phase II, the Commission introduced targeted, efficient support for broadband-capable networks in these unserved rural areas as part of its efforts to close the rural-rural divide and direct funding to parts of rural America where it is most needed. Specifically, the Commission will provide support through "a combination of competitive bidding and a new forward-looking model of the cost of constructing modern multi-purpose networks." Using the cost model to "estimate the support necessary to serve areas where costs are above a specified benchmark, but below a second 'extremely high-cost' benchmark," the Commission will offer each price cap local exchange carrier (LEC) "a model-derived support amount [for a period of five years] in exchange for a commitment to serve all locations in its service territory in a state that, based on the model, fall within the high-cost range and are not served by an competing, unsubsidized provider."

2. The Commission delegated to the Wireline Competition Bureau (Bureau) "the task of selecting a specific engineering cost model and associated inputs that meet the criteria specified" by the Commission. Consistent with the approach taken by the Commission when it implemented a forward-looking model known as the High-Cost Proxy Model (HCPM) to determine support amounts for non-rural carriers in the wake of the implementation of the Telecommunications Act of 1996, the Bureau's plan is to adopt a model to estimate forward-looking costs in two separate orders. In this first order, we primarily address the model platform, which is the basic framework for the model consisting of key assumptions about the design of the network and network engineering. We also address certain framework issues relating to inputs.

II. DISCUSSION

3. This order focuses on the platform components of the cost-to-serve module. As detailed below, and consistent with the approach previously taken by the Commission in adopting its prior forward-looking model for universal service support, we adopt a model platform that will allow the

Bureau to estimate the full average monthly cost of operating and maintaining an efficient, modern network. Specifically, the model will begin by estimating all capital and operating expenses associated with a modern network. Those variously-timed expenditures will be converted to an average monthly cost, as described below. Because providers' support will be based on this average cost for five years, while many components of an actual network have much longer lives, using this average cost approach will not compensate providers for the full cost of a network within the five year Phase II timeframe. It will, however, estimate the cost of providing service in the way that best approximates the discipline of a competitive market.

4. The average costs will be based on an efficient modern network, rather than a less efficient legacy network supplemented with incremental upgrades over time. That is, consistent with the Commission's directive to adopt a "forward-looking" approach, we will model the costs as if all providers were able to claim the efficiency advantages of a modern green-field build, rather than attempt to model costs of upgrades and inefficiencies associated with maintaining and upgrading legacy networks piecemeal (a "brown-field" approach). Although some commenters have argued that a "brown-field" approach would result in lower modeled costs, we find that this is only because the various brown-field estimates in the record have each improperly excluded certain costs.

5. Following the assumption of a maximally efficient modern network, modeled costs will be based on an IP-based FTTP network of a wireline telecommunications provider, capable of providing both voice and broadband. Customer locations, both residential and business, will be placed in individual census blocks, and a network topology will be constructed to serve all of those locations. Consistent with the Commission's approach when it developed the HCPM in the 1990s, the model will calculate necessary interoffice transport (i.e., middle mile), which, in a modern network, would connect all central offices with internet gateways. The model will provide the capability to vary certain input values relating to the cost of construction based on physical geography within a given state. Costs will be calculated on a census block level.

6. Although a large number of important decisions regarding input values and other issues remain, preliminary estimates based on the current version of the CAM suggest that this better calibrated approach results in more reliable cost estimates of an efficient provider. Using the platform decisions adopted in this Report and Order, we estimate that per-location costs for the highest cost areas (those potentially available for Phase II funding) are roughly 20-25 percent lower in the current version of the CAM than in the cost model submitted by the ABC Coalition prior to the Commission's adoption of the USF/ICC Transformation Order. The work done to date thus has modified aspects of the CQBAT model that led to an overstatement of the costs of providing broadband-capable infrastructure in Phase II areas.

A. Threshold Model Design/Platform Issues

1. General Approach to Cost Estimation

7. Consistent with Commission precedent, the model platform that we adopt today will calculate a levelized cost that represents an estimate of the average monthly forward-looking cost of an efficient provider. Those costs include both capital and operating expenses. Recovery for each asset class, for example, poles, conduit, etc., will be spread out evenly over the useful life of the asset class according to empirical estimates of the rate at which elements of the asset class are retired. Costs will be levelized to produce a constant monthly cost throughout the life of each asset, which in many cases may exceed 20 years or more. Because a significant driver of network costs are assets with an accounting lifetime of 20 years or more, such as loop plant, the levelized cost calculated by the model will provide recovery for only a portion of the cost of the network over the five-year term of Phase II. In other words, as discussed more fully below, the model platform will calculate costs assuming that the supported network will retain significant value at the end of the five-year term of Phase II support.

2. Network Design

8. In the USF/ICC Transformation Order, the Commission delegated to the Bureau the authority to select the specific engineering cost model, including the modeled network architecture. The Commission indicated that the Bureau's "ultimate choice of a greenfield or brownfield model, the

modeled architecture, and the costs and inputs of that model should ensure that the public interest obligations are achieved as cost-effectively as possible."

9. In the Model Design PN, 77 FR 38804, June 29, 2012, the Bureau sought comment on, among other things, the choice of a green-field or brown-field model; whether the model should estimate the costs of FTTP or Digital Subscriber Line (DSL) (including Fiber-to-the-Node (FTTN)) technology; and what terminal value to assign to the modeled network (e.g., book value or zero value). The Bureau also sought comment on whether the model should estimate the total costs of serving the entire service area so that shared costs may be distributed between areas that are eligible and ineligible for support, or estimate only the standalone costs of areas eligible for support; how shared network costs should be distributed to the census-block (or smaller) area; and whether the model should calculate support for areas to which broadband has already been deployed or only for unserved areas.

10. As discussed below, we conclude that the Connect America Cost Model will be a green-field FTTP model with the terminal value of the network at the end of the five-year term determined by the book value of the assets. As explained in the Model Design PN, the issues of network technology (e.g., FTTP or DSL), design (green-field or brown-field) and terminal value (e.g., book value or zero value) are interrelated. We conclude that using a green-field FTTP model paired with book value is the best choice for estimating the most efficient forward-looking cost of providing service over a voice and broadband-capable wireline network in price cap areas.

a. Green-field vs. Brown-field

11. We find that using a green-field model is more appropriate than using a brown-field model, for three principle reasons. First, a green-field model is consistent with Commission precedent, including the USF/ICC Transformation Order. Second, a green-field model provides an estimate of costs that creates appropriate incentives to invest—that is, it best approximates the discipline provided by a competitive market. And finally, a green-field model can be implemented in a straightforward and timely manner. Contrary to some commenters' assertions, we conclude that a green-field model does not over-compensate providers. Indeed, a levelized green-field approach is likely to result in no more support than

a properly calculated levelized brown-field approach because it approximates the average long-run cost of an efficient modern network optimized for voice and broadband, rather than the average long-run cost of a less efficient legacy voice network plus broadband upgrades.

12. First, a green-field approach is consistent with Commission's determination in the USF/ICC Transformation Order in that it would use a forward-looking cost model to identify price cap areas eligible for Connect America Phase II support, as well as other Commission precedent. A green-field approach is forward-looking because it estimates the cost of the ongoing provision of specific services by developing a hypothetical efficient, modern network to calculate the minimum cost of providing such services now and in the future, given current technology and input costs. It does not take into account historic costs or whether the carrier historically recovered its earlier investments in the existing network, other than what is provided through the monthly levelized cost stream going forward.

13. A green-field model is consistent with the approach taken by the Commission in developing and adopting its previous voice cost model, the HCPM. Even though legacy voice networks existed throughout the nation at that time, often including less-efficient older technologies or inefficient network routing, the Commission concluded that the appropriate way to determine support was to estimate the cost of an efficient modern network to provide voice service, assuming only the existence of incumbent central offices and current wire centers (referred to as the "scorched node" approach). Consistent with this longstanding precedent, the green-field approach we adopt will calculate (1) the minimum, levelized cost of a voice and broadband-capable network today, using current, rather than historic, technologies and prices, and (2) the minimum costs of continued provision of voice and broadband services on that network, including the costs of maintaining the network's capabilities in each year going forward.

14. Second, consistent with longstanding Commission precedent, we adopt a green-field approach because it estimates costs in a manner that provides appropriate forward-looking incentives to invest. A forward-looking approach to cost modeling does not ask whether or to what extent carriers' have recovered their costs from past investments. Instead, a forward-looking model calculates costs at a

level expected to recover all network costs over the long term, accounting for investment risk and anticipated demand, comparable to a market with sustainable competition. In such a regulatory environment, recipients of support should receive appropriate forward-looking compensation for risks that are intended to mimic the risks that competitive firms face in markets where subsidies are not provided.

15. We are not persuaded by the argument that using a green-field model for Connect America Phase II will over-compensate the price cap carriers over a five-year period because the actual replacement costs incurred over the next five years may in some instances be less than the green-field levelized cost. The Commission previously has concluded that forward-looking economic costs – not actual costs – are the proper framework for determining universal service support, and the Commission specifically directed the Bureau to use a forward-looking approach in the USF/ICC Transformation Order. Moreover, whether an individual price cap carrier would actually spend more or less than model-determined support over the course of the five-year term will depend on where the individual price cap carriers that make a state-level commitment are in their respective investment cycles. Carriers have made and must continue to make investments that last substantially longer than five years, incurring costs that do not, year-by-year, match their revenues (even for the case of commercially-viable investments). Those carriers that must undertake a relatively high level of asset replacement may therefore face higher costs than the modeled costs. Others will face lower costs. Allowing monthly recovery of the model's levelized cost means, on average, all carriers will earn an amount that would allow them to maintain the specified levels of service going forward over the longer term.

16. Indeed, a green-field model may calculate costs lower than actual costs because it may overstate the degree to which carriers are able, in practice, to optimize their network. Carriers do not have the luxury of building their networks from the ground up to meet today's demand. Rather, they augment their networks piecemeal, with each upgrade subject to past investment decisions that may not always have been based on accurate forecasts of demand and technology developments. Consistent with Commission precedent in adopting a green-field model to estimate the forward-looking cost of voice

service, we find that, on balance, the green-field approach should provide a reasonable overall approximation of costs for Phase II implementation.

17. Third, a forward-looking green-field approach can be implemented in a straightforward and timely manner, allowing the fastest possible deployment of new broadband in price cap territories. Each version of the CAM released to date contains the capability to estimate the costs of a green-field FTTP network. Moreover, the ABC Coalition previously submitted into the record of this proceeding more than a year ago a green-field model. As a result, the public and Bureau staff have had ample opportunity to analyze the attributes and the usefulness of a green-field model for implementing the Commission's universal service policies. These submissions build on a substantial history of use of green-field models in a variety of regulatory contexts. In contrast, as discussed in more detail below, we are not satisfied that any version of the CAM has yet provided a reasonable way of estimating brown-field costs. We therefore conclude that adopting a green-field model platform now, so that parties can focus their attention on input values, will facilitate the timely conclusion of the Phase II cost model development process, and thereby accelerate the deployment of broadband-capable networks to unserved Americans.

18. In contrast to a green-field approach, there are significant drawbacks to a brown-field approach. First, notwithstanding arguments to the contrary, a brown-field approach is not entirely forward-looking. It represents a hybrid approach that falls between a true forward-looking approach, which a green-field model approximates, and a historic cost approach. A brown-field approach assumes existing infrastructure as of a point in time and adds the ongoing costs of this infrastructure to the cost of additional network upgrades necessary to provide a desired set of services in the future. As an example, existing fiber transport, and/or the last few thousand feet of copper terminating at an end-user location, could potentially be used to supply voice and broadband service. For these portions of the network , a brown-field approach would estimate costs based on the existing network facilities, rather than on a modern, efficient network.

19. Second, there would be serious practical hurdles to overcome before we could implement such an approach. The Bureau considered two possible ways to implement a brown-field approach: one that identifies those assets actually in place, and then considers the incremental cost of making that existing network broadband-capable, and another that produces a hypothetical model of a voice-only network, and then considers the incremental cost of adding broadband capability to that network. Both approaches raise significant practical difficulties.

20. The first approach to brown-field modeling has significant backward-looking elements not present in a green-field approach and is substantially more complicated than a green-field approach. In particular, this brown-field approach would require identification of the specific existing network assets that are assumed to be retained. Thus, we would need to develop a model that accurately represents the existing network infrastructure and determine what parts of the existing network can be used; we then would estimate the cost of any incremental upgrades required to meet the Commission's service obligations going forward, including the costs that would be necessary going forward to maintain the entire network's capabilities. In contrast to a green-field approach, this brown-field approach would require a substantial backward-looking exercise in which those components of the network that already exist must be identified and located, and characterized in terms of their age and capabilities going forward (e.g., gauge of copper wire, etc.). Additionally, this brown-field approach would model the forward-looking costs of augmenting the existing network to make it broadband-capable. In comparison to a green-field approach, such an exercise would likely require far more data, because existing network investments would need to be catalogued, and it would present a more complex cost optimization, because the optimal network would be designed to account for the elements of the existing network that would be efficient to keep. This would be particularly complex, requiring the Bureau to make decisions about what assets should be retained, and what should be replaced.

21. The second approach to brown-field modeling would be to estimate the green-field cost of the existing network and then estimate the incremental cost of making that network fully broadband-capable. This approach avoids the difficulties of cataloging existing network infrastructure, and of having

to optimize taking historical investment decisions into account, but has the peculiarity of using a hypothetical optimized green-field cost model to estimate the cost of an existing network. While such an approach would limit the amount of data that would be required and would avoid some of the backward looking nature of the first approach, it only obliquely meets the ostensible objective of a brown-field approach, which is to assume that all existing infrastructure will be retained, with upgrades to make that network fully broadband-capable. In addition, taking this approach still would require the Bureau to make a substantial number of assumptions about the age and quality of existing assets and therefore significantly broaden the reasonable range of outcomes, compared to a green-field model. The Bureau first would have to determine which hypothetical assets are assumed to exist as the starting point, and then model the investments required to make that network capable of supplying broadband. In contrast, the green-field approach requires only modeling a current generation, modern network.

22. We are not persuaded by ACA's argument that a brown-field approach would result in cost estimates substantially lower than a green-field model, and therefore expand the number of unserved homes that could receive broadband given the fixed budget for Phase II. ACA's attempts to estimate brown-field costs exclude some costs that should be included in a proper brown-field model. In response to the Model Design PN, ACA argues that "the CQBAT model [submitted by the ABC Coalition] includes functionality to allow for the modeling of a brownfield DSL build-out." In fact, that function in CQBAT simply eliminated all capital expenditures for certain network elements, such as copper loops. ACA acknowledged that CQBAT did not adequately account for the operating expenses associated with the copper portion of the loop, copper replacement in cases where plant needs to be replaced, and loop conditioning costs on a granular level, but argued that adding these functionalities to the model should not be difficult. Subsequently, in October 2012, ACA filed additional estimates of brown-field costs based on CQBAT runs under various scenarios, each of which excluded certain capital costs, such as copper loops, necessary for providing ongoing service from the calculations, and we find it would be appropriate to take these costs into account in a brown-field model. Therefore, we are not persuaded that the calculations provided by ACA appropriately reflect the cost estimates of a brown-field approach, and

conclude that ACA does not provide a reliable estimate of the number of homes that would become served by broadband in Phase II.

23. While CAM version 3.0 contains a feature that attempts to approximate brown-field costs, we still do not believe this approach fully corrects the issues associated with the CQBAT model's brown-field approach. This "brown-field adjustment" was intended to capture the replacement cost of existing plant as those assets are retired, but not to capture the cost of existing plant that is continued to be used to provide the existing services. That is, the calculation captures the cost of providing service when an asset is retired, but not of providing service until that point. We therefore conclude that additional costs would have to be added to this brown-field adjustment to properly take into account the existing assets necessary to provide and maintain voice and broadband services on an ongoing basis. In fact, we now are convinced that if all these costs are properly accounted for, brown-field modeling should provide cost estimates no lower than, or potentially higher than, a green-field approach.

24. In sum, we find that a green-field cost approach is the preferable approach to calculate the cost of a forward-looking network. It is more consistent with the Commission's directive and prior precedent, and we conclude that there are no persuasive arguments that using a green-field approach would result in overpayments to the price cap carriers. In contrast, development of a suitable brown-field model would likely take a considerable amount of additional time and delay in implementation of Connect America Phase II, because it is a much more complex undertaking with little precedent to guide staff efforts.

b. FTTP

25. We also conclude the best approach to meet the Commission's directive that we adopt a forward-looking cost model is to estimate the costs of a FTTP network rather than a twisted copper pair DSL network. As explained in the Model Design PN, a DSL network "is only forward looking from the perspective of decisions made a decade or more in the past," and "has higher expected operating expenses and is more likely to require significant additional investment to make faster broadband offerings available." Although some price cap carriers may choose to extend broadband to unserved areas in the

near term by shortening copper loops, rather than deploying FTTP, the most efficient wireline technology being deployed today in new builds is FTTP. Network construction costs are essentially the same whether a carrier is deploying copper or fiber, but fiber networks result in significant savings in outside plant operating costs over time. If an efficient carrier were to design a new wireline network today, it would be an all Internet protocol (IP) fiber network, not a circuit switched copper network, because such a network would be cheaper and more scalable over time. Indeed, an IP fiber network would be the appropriate choice for a wireline network even if there were no service obligation to extend broadband. Therefore, FTTP is more consistent with a forward-looking approach.

c. Methodology for Determining Terminal Value

26. The model platform that we adopt today provides capital recovery through what is termed depreciation. We conclude that the model should determine the terminal value of the network based on "book value" calculated as the difference between investment and economic depreciation, which takes into account the economic life of the equipment and infrastructure. Specifically, the model will calculate book depreciation expense based on equal-life-group methodologies, using Gompertz-Makeham survivor (mortality) curves and projected economic lives. The model will adjust the survivor curves, however, so that the average lifetime of the asset falls within the range of expected accounting lifetimes authorized by the Commission. This approach is consistent with the methodology used in the Commission's previous cost model used to determine support amounts for the non-rural LECs, HCPM, and supported in the current record.

27. In the virtual workshop, the Bureau sought comment on whether any of the projected lives used in HCPM are outdated and should be modified. The ABC Coalition recommended that the Bureau uses the same economic lives for assets as HCPM, while ACS suggested the Commission's economic lives are too long and should be updated. Based on our review of the record, we now conclude the model will utilize the same economic lives for assets as specified by the Commission previously when it adopted the HCPM, when determining the monthly cost of capital investments. As the ABC Coalition notes, for more than a decade, these economic lives for assets have been widely used in cost models in

state regulatory proceedings. We are persuaded that it would be administratively burdensome to establish new values, which would unnecessarily delay implementation of Connect America Phase II. We recognize that to the extent economic lives are overstated for particular assets that would result in a systematic understatement of costs, but no party has submitted any evidence in the record demonstrating that this effect would result in a material change in support levels thwarting achievement of the Commission's universal service objectives.

28. As the Bureau explained in the Model Design PN, the annual cost and support values are highly dependent on the terminal value, because the five-year support period is much shorter than the average lifetime of all of the asset classes in the model. At the end of five years, a FTTP network would have significant commercial value. Because estimating commercial value at the end of the five-year term would require making a number of assumptions about the evolution of technology and the marketplace, we conclude that using book value is the best approach. Using a terminal value of zero, as some parties advocate, would permit carriers to recover the entire cost of the network over five years, and assume the network had no future commercial value. We find that to be an unreasonable assumption and would over-compensate carriers, so we decline to use a zero terminal value in CAM.

3. Assigning Shared Network Costs

29. The Commission concluded in the USF/ICC Transformation Order that it would use a forward-looking model capable of determining "on a census block or smaller basis, areas that will be eligible for CAF Phase II support." As a threshold matter, we conclude that the model will calculate costs at the census block level, except in those instances where a census block is split between two service providers. The model will calculate costs at a significantly more granular level than the Commission's prior forward-looking model, HCPM, which calculated costs at the wire center level. There are approximately 11 million census blocks, compared to approximately 20,000 wire centers. We therefore conclude that calculating costs at the census block level will be sufficient to meet the Commission's objective of targeting support to high cost areas.

30. The Commission also concluded that "it would be appropriate to exclude any area served by an unsubsidized competitor" that meets the Commission's initial performance requirements. Most costs in a network are shared costs. As a result, the method used to attribute the costs of shared plant to eligible and ineligible areas and among census block or smaller areas will have a significant effect on the relative cost of serving different areas.

31. In the Model Design PN, the Bureau asked how shared network costs should be assigned between eligible and ineligible areas. Specifically, the Bureau asked whether costs should be modeled for the entire service areas and then allocated between eligible and ineligible areas or costs should be estimated only for the eligible areas on a standalone basis.

32. We conclude that the Connect America Cost Model will model the total cost of serving an entire service territory within a state, rather than calculating the standalone costs of serving only eligible census blocks, and then, as more fully discussed below, allocate the shared costs between eligible and ineligible census blocks. Modeling the costs associated with a complete network (i.e., including both eligible and ineligible census blocks) and then assigning shared costs between the eligible and ineligible census blocks has significant benefits. First, it more accurately depicts an economically efficient network and provider. An economically efficient network would cover all or most locations in a given service territory, rather than only serving a small subset of locations that lack broadband. Indeed, building a network to only serve those locations that lack broadband would likely result in higher cost estimates for those areas than otherwise would be the case, because the service provider would have to deploy less than optimal routing to reach those pockets of customers that are in eligible census blocks. Moreover, an economically efficient provider would not generally cede a large fraction of customers within its service territory to unsubsidized competitors; rather, it would seek to compete in those areas where a positive business case exists. Modeling the entire network and then making adjustments to determine support for particular census blocks where there is no unsubsidized competitor is a reasonable way to proceed. Finally, the Bureau notes that this approach has broad support in the record. For these reasons, the Bureau finds that it is appropriate for the Connect America Cost Model to model the total cost of serving

the entire state, not the standalone costs of only serving eligible census blocks, and then allocate shared costs between eligible and ineligible census blocks.

33. In the Model Design PN, the Bureau also asked how to allocate shared costs consistent with the requirement in the USF/ICC Transformation Order that the model be capable of determining "on a census block or smaller basis, areas that will be eligible for CAF Phase II support." Shared costs need to be allocated not only between eligible and ineligible areas, but among census blocks in eligible areas so that the costs of serving each individual census block can be estimated. The Bureau sought comment on two potential options: (1) a subtractive method, in which the model would estimate only those costs to serve eligible areas that are over and above the costs of serving the ineligible areas, and (2) a pro rata method, in which costs would be assigned to eligible and ineligible areas on some pro rata basis or using some other formula. The Bureau indicated a general preference for the subtractive method, but acknowledged that the computational complexity of the subtractive method might make it difficult or impossible to implement in practice. Subsequently, as part of the virtual workshop, the Bureau sought comment on a possible approach to the subtractive method.

34. Based on our review of the record and our development of CAM to date, we now conclude that the model will use a pro rata method for assigning shared costs. The Bureau gave significant consideration to a subtractive approach for assigning costs, and there was support in the record for such an approach. Ultimately, however, we find that the computational complexity and the novelty of the subtractive approach renders it too difficult to implement. The cost-causation approach contained in the current version of CAM (CAM version 3.0) provides a practical method of assigning shared costs in a reasonable manner. Specifically, the model will use a "cost causation" method that assigns a fraction of the costs associated with a shared network facility according to the relative number of customers in each area using the facility. Using cost causation to allocate costs is consistent with the current High-Cost Proxy Model, the model submitted by the ABC Coalition and the National Broadband Plan modeling. For that reason, the Bureau concludes that the cost-causation approach for sharing costs between eligible and ineligible census blocks is appropriate for use in the Connect America Cost Model.

4. Calculation of Costs for Price Cap Carriers' Currently Served Locations

35. We conclude the model platform will estimate the costs of serving locations irrespective of whether they are currently provided broadband by the ILEC. We find that this approach is consistent with the Commission's goals and directives in the USF/ICC Transformation Order. While the Commission sought to "extend[] broadband to millions of unserved locations," it also recognized the importance of "sustaining existing voice and broadband services." We therefore reject the Joint Michigan Competitors' claim that the model should exclude broadband-served areas because the Commission's focus is on deploying broadband to unserved areas, and ACA's claim that broadband-served areas should only receive ongoing support for maintenance and operational expenses—not for capital expenses.

36. We will presume, consistent with the Commission's direction and predictive judgment, that locations that exceed a specified cost benchmark, which will be determined in a future order, will require support on an ongoing basis based on the total levelized cost of sustaining existing voice and broadband services at reasonable end-user rates. As we noted in the Model Design PN, carriers may have deployed broadband in certain areas based on past universal service support and intercarrier compensation revenues. Even where carriers may have deployed broadband to fulfill merger commitments, because they received another source of funding, or for other reasons, such carriers still may require funding to sustain the previous broadband deployment. And as we explained above, providing support for only maintenance and operational expenses would not cover the entire cost of sustaining service.

37. Moreover, treating locations currently served by the incumbent differently from completely unserved locations is inconsistent with a using a green-field approach to estimate the costs of an efficient modern network optimized for voice and broadband. Treating served and unserved locations differently would require modeling actual historical network deployment, rather than an efficient forward-looking network. This is functionally similar to the first approach to brown-field modeling, which would require an extensive data collection, while unnecessarily delaying implementation of Phase II.

38. Accordingly, we reject commenters' claims that areas already served by broadband do not require ongoing support, (or only require limited ongoing support), and we conclude that the model

will include and calculate ongoing support for high-cost locations above the cost benchmark that are both served and unserved by broadband. We note that this is consistent with the Commission's approach when it adopted HCPM; it calculated the cost of an efficient provider to provide voice service throughout the territory of a non-rural LEC, even though those LECs already provided voice.

5. Treatment of Non-Contiguous United States

39. The Commission has "direct[ed] the [Bureau] to consider the unique circumstances of [Alaska, Hawaii, Puerto Rico, the U.S. Virgin Islands and Northern Marianas Islands] when adopting a cost model." The Commission further directed the Bureau to determine whether the cost model provides sufficient support to these areas, and if, in the Bureau's determination, the model does not provide these areas with sufficient support, the Commission granted the Bureau the discretion to "maintain existing support levels, as modified in this Order, to any affected price cap carrier, without exceeding the overall budget of $1.8 billion per year for price cap areas." The Bureau has sought comment to further develop the record on these two options for areas outside the contiguous United States, and the associated service obligations.

40. The decisions we make herein do not prejudge whether modifications to the model platform or input values should be made with respect to the non-contiguous United States, or support levels for those areas should be frozen. We will address those arguments at a future date.

B. Customer Locations and Outside Plant Design

41. As the Commission recognized when it adopted the model platform for HCPM, outside plant – namely, the loop facilities between switches and the customer premises – constitutes the largest portion of total network investment, and the design of outside plant facilities depends heavily on the location of customers. Business customer information is important not only for locating business customers, but also for scaling the network infrastructure to ensure that the costs of shared resources are appropriately shared among all users. The placement of customer locations thus is an important element of the CAM platform.

1. Customer Locations

42. In the Model Design PN, the Bureau proposed to use a commercial data set for residential customer location data, but also sought comment on two alternatives: using official government census data, which would provide the number of housing units in a census block but no geocodes, and collecting actual customer location data from providers. For business locations, the Bureau proposed using government data from the U.S. Bureau of Labor Statistics (BLS) Economic Census, but also sought comment on using commercial data sources. The Bureau sought further comment via the CAM virtual workshop on methods for determining customer locations.

43. Few commenters offered any comments about customer locations data. In the absence of actual geocode information, the ABC Coalition supports using a methodology that uses a combination of data sources to estimate the number of customer locations by zip code and then distribute those locations randomly along roads in the census block. The only commenter suggesting an alternative source for customer location data is the National Association of State Utility Consumer Advocates (NASUCA), which proposed the Commission obtain E911 databases and translate the addresses into geocodes that can be used in the cost model. If the Commission uses census data, NASUCA argues that these data should be augmented by geocoded data provided by the carriers in census blocks above a certain size.

44. We adopt a model platform that will use a combination of commercial data set (GeoResults Q3 2012) and census data to determine residential and business locations. Specifically, the model will use GeoResults Q3 2012, which provides an address-based residential data set of households. To the extent there are discrepancies between the location counts from GeoResults and 2011 census housing unit estimates, the GeoResults count will be adjusted upward or downward to conform to the census, with the records for the requisite number of locations to be added or subtracted selected in a random manner. We conclude the model also should use GeoReults for business location data, because those data are more current and include more businesses than the BLS economic census data. GeoResults also provides a national building file, which is used to identify buildings that have both residential and

business customers. The model will use additional data sources to identify the locations of community anchor institutions and cell towers.

45. The CAM will use geocoded locations wherever possible, and place locations that cannot be geocoded randomly along the roads within the census block. This is an improvement upon the approach previously taken by the Commission when it implemented HCPM. By using geocoded data where available, the model will estimate with greater precision the amount of feeder plant necessary to reach all locations, which should result in more accurate cost estimates than the prior forward-looking cost model utilized by the Commission, which assigned all locations randomly along roads using Topologically Integrated Geographic Encoding and Referencing (TIGER) data.

46. We find that using these data is preferable to using E911 data, supplemented by carrier-provided data, as suggested by NASUCA. First, NASUCA does not specifically identify the E911 database(s) that it contends should be used. Moreover, an approach based on E911databases would potentially introduce inconsistencies in the model across states, because each state and, in many instances depending on state and local regulations, individual Public Safety Answering Points (PSAPs), are responsible for their E911 databases, and these databases differ in methodology, completeness and accuracy. Using a consistent methodology throughout the nation will lessen the likelihood of inconsistencies in cost estimates among states, which could skew the relative distribution of support in unknown ways among the states.

47. We conclude that it is not feasible to develop a model platform that incorporates actual customer locations for all locations. There is no publicly available source of nationwide geocoded location data, and commercial data sources do not provide geocodes for all locations. Even if the price cap carriers provided the Commission with their geo-coded customer database, or address list if they do not have geo-coded customer locations, these data bases would only include the incumbent local exchange carriers' customers and not all the housing units in the census block. Doing a mandatory data collection that collected customer location information from cable operators and other non-incumbent providers would be a significant Commission undertaking, and it would impose burdens on those

providers. Nothing in the record before us suggests that the incremental improvement in precision of locations that would result from such a mandatory data collection would be worth the costs in terms of burden on both the Commission and outside parties. Accordingly, we conclude that GeoResults, trued-up with Census data for residential locations, is the best source of customer locations because of the number of locations that are geocoded. The final model will use the methodology in CAM version 3.0 for assigning included locations that cannot be geocoded along road segments.

2. Clustering

48. We adopt a clustering approach that uses road-based routing to determine the maximum size of the clusters. Once customer locations have been identified, the model must determine how to group and serve those customers in an efficient and technologically reasonable manner. Consistent with past Commission precedent for forward-looking cost models, the objective is to group customers into serving areas in an efficient manner to minimize costs, while maintaining a specified level of network performance equality. Like HCPM, our model platform will design clusters consistent with engineering constraints, grouping customers so that they are no further away than allowed by network design to deliver services meeting the Commission's performance requirements. CAM will improve the approach previously used by the Commission in HCPM, however, as it will use road-based routing to determine the maximum size of the clusters. Thus, clusters defined by CAM are likely smaller, but more realistic estimates of cluster size, resulting in more accurate cost estimates. By using road segments in clustering, the CAM model avoids the problem of having the length of some loops modeled along roads exceed the maximum loop length necessary to provide service meeting specified standards. The ABC Coalition supported this approach, and no party objects to using this clustering methodology for modeling costs in the contiguous United States. We conclude that the model will include the clustering methodology currently incorporated into CAM version 3.0.

3. Routing

49. We adopt the routing methodology used in CAM, which builds plant along roads and uses a minimum spanning tree algorithm. Although HCPM allowed for minimum spanning-tree

optimization of routes, it did not use the road network. CAM, on the other hand, represents an enhancement to the approach taken by the Commission in developing a forward-looking model in the 1990's, as it lays loop plant along actual road segments and utilizes a spanning tree algorithm to find the lowest cost route to serve all customer locations along road paths. The ABC Coalition supported this approach, and no party objects to using this routing methodology for modeling costs in the contiguous United States. We conclude that the model platform will include the CAM version 3.0 algorithm for routing loop plant and feeder network.

4. Sizing Network Facilities

50. We adopt a model platform that will size network facilities such that there is sufficient capacity at the time of peak usage. The model platform accomplishes this by ensuring that the size of each link in the network is sufficient to support peak usage busy hour offered load, taking into account subscriber usage capacity (GB/month/subscriber) as well as throughput (Mbps) and take-rate. This method is basically the same approach that was taken in the National Broadband Plan modeling. Because voice is the supported service, the model also takes into account peak demands associated with voice service in the sizing calculations. No party objects to this general approach to network sizing. The ABC Coalition agrees that sizing broadband facilities based on throughput required at the time of peak usage is reasonable, while noting that the peak demands associated with voice service should be included in the sizing calculations if voice capability is to be added to the model. We will address the specific input values the model will use for busy hour under load in a future order.

C. Switching and Interoffice Facilities

1. Voice Capability

51. In the USF/ICC Transformation Order, the Commission determined that "voice telephony service" is the service supported by federal high-cost universal support. All recipients must offer voice telephony service. In addition, as a condition of receiving support, all recipients must offer broadband service.

52. We adopt a model platform that estimates the cost of an IP-enabled network capable of providing voice service. The cost is modeled on a per-subscriber basis and takes into account the cost of hardware, software, services, and customer premises equipment to provide carrier-grade Voice over Internet Protocol (VoIP) service. No party objects to this general methodology for including voice capability to serve the contiguous United States, and the ABC Coalition supports this approach. We conclude that the appropriate forward-looking way to model a network today that provides voice service is to design an all-IP network. The specific inputs used to calculate the per-subscriber cost will be addressed in a future order.

2. Interoffice Facilities

53. We adopt a model platform that ties central offices to the nearest tandem location, ties tandems together, and uses efficient routing paths for all connections, using information from the Local Exchange Routing Guide database. The model platform assumes Ethernet-based fiber connections among wire centers and between wire centers and tandem switches, including the use of wave division multiplexing gateways. Additionally, the model platform connects each hierarchy to the nearest (lowest cost) Internet access point regardless of ownership. The model platform also uses routing along roads to determine the cost of deploying fiber to make connections, and includes Broadband Remote Access Services and/or gateway costs. No party objects to this general approach for the contiguous United States, and the ABC Coalition supports this approach. This is consistent with the HCPM, which also included the middle mile costs of providing service. We will address cost inputs related to interoffice transport in a future order.

D. Framework for Capturing Variations in Cost

54. As discussed more fully below, the CAM will utilize differing assumptions for certain input values based on three geographic density zones, and will adjust certain input values for labor and materials based on the three-digit zip code.

1. Plant Mix Based on Density Zone

55. The cost of a modern broadband network varies significantly based on the type of infrastructure used to deploy the wires – specifically whether the wires are underground, buried or aerial. Most networks rely on all three types of plant in varying degrees, with the precise mix of plant dependent on many factors. A model used to estimate the costs of deploying a network must therefore make assumptions regarding the mix of plant used in the network.

56. We adopt a model that assumes that each state is made up of three density zones – urban, suburban, and rural. For each density zone, the model will assume a specific plant mix for each of three different parts of the network – distribution, feeder, and inter-office transport. As a result, each state will have a matrix of nine different density zone/network component combinations, each of which has its own mix of underground, buried, and aerial plant. In addition, the model will include a nationwide set of plant mixes for each density zone and network component, which may be used in any state for which specific inputs may not be available.

57. The Bureau concludes that this methodology will provide sufficiently granular variation in the mix of plant in the entire network. We recognize that the HCPM varied cost by nine density zones, but no party in the current proceeding objects to using three geographic zones. The ABC Coalition notes there was no variation in the plant mix between the least dense zones in HCPM, which together correspond to the rural zone in the model we are evaluating.

58. No commenter objected to the general principle that plant mix should vary according to density zones, with different plant mix values in different areas. Rather, the parties that addressed this issue argued there should be a process to document the development of the specific input values to be used. The source and specific percentages of plant mix to be used in the matrix will be determined in a future order addressing inputs.

2. Material and Labor Cost Adjustments Based on Location

59. We adopt an approach that utilizes uniform input values for various capital costs, with adjustments for regional variations in labor and material costs. We conclude that this approach to development of a forward-looking model is consistent with past precedent. In the HCPM Inputs Order, 64 FR 67372, December 1, 1999, the Commission determined nationwide default values are generally more appropriate than company-specific input values for a forward-looking model. It noted that the universal service support mechanism is "based on the estimated costs that an efficient carrier would incur to provide the supported services, rather than on the specific carrier's book costs." It concluded that "it would be administratively unworkable to use company-specific values in the federal nationwide model." At the same time, however, the Commission recognized the desirability of having data that accurately and objectively reflect "variations in forward-looking costs based on objective criteria," and it stated that it was open to additional modifications of inputs in the future. Thus, although the Commission did not adjust costs for regional variation in adopting HCPM, it expressly recognized that a forward-looking model could appropriately recognize variations in cost.

60. Our forward-looking model will use regional cost adjustment factors to capture variation in labor and materials costs by three-digit ZIP codes. Those regional adjustments are based on data obtained from a national survey of the costs of construction in various areas of the United States by R.S. Means. The ABC Coalition supports this approach of using nationwide average values with regional adjustments, noting that the R.S. Means data is widely recognized and used in numerous contexts. No party objected to the use of this methodology for areas in the contiguous United States.

III. PROCEDURAL MATTERS

A. Paperwork Reduction Act

61. This document does not contain new or modified information collection requirements subject to the Paperwork Reduction Act of 1995 (PRA), Public Law 104-13. In addition, therefore, it does not contain any new or modified information collection burden for small business concerns with

fewer than 25 employees, pursuant to the Small Business Paperwork Relief Act of 2002, Public Law 107-198.

B. Final Regulatory Flexibility Act Certification

62. The Regulatory Flexibility Act of 1980, as amended (RFA), requires that a regulatory flexibility analysis be prepared for rulemaking proceedings, unless the agency certifies that "the rule will not have a significant economic impact on a substantial number of small entities." The RFA generally defines "small entity" as having the same meaning as the terms "small business," "small organization," and "small governmental jurisdiction." In addition, the term "small business" has the same meaning as the term "small business concern" under the Small Business Act. A small business concern is one which: (1) is independently owned and operated; (2) is not dominant in its field of operation; and (3) satisfies any additional criteria established by the Small Business Administration (SBA).

63. In this Report and Order, we adopt a model platform for the Connect America Phase II cost model that will calculate a levelized cost that represents an estimate of the average monthly forward-looking cost of an efficient provider. A model platform is the basic framework for the model consisting of key assumptions about the design of the network and network engineering. We also address certain framework issues relating to inputs for the model. These decisions are not anticipated to have a significant economic impact on small entities, insofar as the model produces high-cost support amounts for price cap carriers and their affiliates that accept the right of first refusal pursuant to Connect America Phase II. This is primarily because most (and perhaps all) of the affected carriers are not small entities. Moreover, the decisions made about the model platform in this Report and Order are not anticipated to systematically increase or decrease support for any particular group of entities as compared to possible alternatives discussed in the record. Therefore, we certify that the decisions made in this Report and Order will not have a significant economic impact on a substantial number of small entities. The Commission will send a copy of the Report and Order, including a copy of this final certification, in a report to Congress pursuant to the SBREFA. In addition, the Report and Order and this certification will be sent to the Chief Counsel for Advocacy of the SBA, and will be published in the Federal Register.

C. Congressional Review Act

64. The Commission will send a copy of this Report and Order to Congress and the Government Accountability Office pursuant to the Congressional Review Act.

IV. ORDERING CLAUSES

65. Accordingly, IT IS ORDERED, pursuant to the authority contained in sections 1, 2, 4(i), 5, 214, 254, 303(r), and 403 of the Communications Act of 1934, as amended, and section 706 of the Telecommunications Act of 1996, 47 U.S.C. 151, 152, 154(i), 155, 214, 254, 303(r), 403, and 1302, sections 0.91, 0.201(d), 1.1, and 1.427 of the Commission's rules, 47 CFR 0.91, 0.201(d), 1.1, 1.427, and the delegations of authority in paragraphs 157, 184, 186, 187, and 192 of the USF/ICC Transformation Order, FCC 11-161, that this Report and Order IS ADOPTED, effective thirty (30) days after publication of the text or summary thereof in the Federal Register.

FEDERAL COMUNICATIONS COMMISSION

Carol E. Mattey
Deputy Chief, Wireline Competition Bureau.

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